

WHAT IS CLAIMED IS:

1. A turbine housing assembly for an exhaust-gas-driven turbocharger turbine, comprising:

5 a sector-divided turbine housing defining a generally annular chamber structured and arranged to surround a turbine wheel, a plurality of circumferentially spaced dividing walls extending generally radially inwardly from a radially outer wall of the chamber and dividing the chamber into a plurality of separate angular sectors each of which occupies a fractional part of a
10 circumference of the chamber, the sectors succeeding one another in a circumferential direction of the chamber, each sector of the chamber at a radially inward side thereof having an axial length;

 a vane assembly for guiding flow from the chamber into the turbine wheel, the vane assembly comprising vanes that include at least dividing vanes, the
15 dividing vanes corresponding in number to the number of dividing walls, each dividing vane forming an extension of one of the dividing walls and extending generally radially inwardly from the dividing wall and terminating at a trailing edge of the dividing vane, the dividing vanes thereby extending the sector-division of the turbine housing to the trailing edges of the dividing vanes; and

20 a variable-geometry mechanism comprising a tubular piston disposed radially inward of the chamber, the piston being axially slidable relative to the chamber between a relatively open position and a relatively closed position in which a fractional portion of the axial length of the sectors is blocked by the piston so as to limit flow into the turbine wheel, wherein the piston and the dividing vanes
25 overlap radially, the dividing vanes are mounted on one of the piston and a fixed structure of the turbine, and the dividing vanes are received in axially extending slots of the other of the piston and the fixed structure when the piston is in the closed position.

2. The turbine housing assembly of claim 1, wherein the dividing vanes are
30 structured and arranged to extend fully across that portion of the sectors that is

open for all possible positions of the piston between the open and closed positions thereof.

3. The turbine housing assembly of claim 1, wherein the dividing vanes are mounted on the fixed structure of the turbine and the slots are formed in the piston
5 for receiving the dividing vanes.

4. The turbine housing assembly of claim 3, wherein the vane assembly further comprises additional vanes located circumferentially between the dividing vanes and mounted on the fixed structure.

5. The turbine housing assembly of claim 4, wherein the additional vanes
10 extend along less than the full axial length of the sectors and are axially located such that when the piston is in the closed position the additional vanes extend fully across that portion of the sectors that remains open.

6. The turbine housing assembly of claim 1, wherein the dividing vanes are mounted on the piston and the slots are formed in the fixed structure for receiving
15 the dividing vanes.

7. The turbine housing assembly of claim 6, wherein the vane assembly comprises additional vanes located circumferentially between the dividing vanes.

8. A turbine for an exhaust-gas-driven turbocharger, comprising:
a turbine wheel;
20 a sector-divided turbine housing defining a generally annular chamber surrounding the turbine wheel, a plurality of circumferentially spaced dividing walls extending generally radially inwardly from a radially outer wall of the chamber and dividing the chamber into a plurality of separate angular sectors each of which occupies a fractional part of a circumference of the chamber, the sectors
25 succeeding one another in a circumferential direction of the chamber, each sector of the chamber at a radially inward side thereof having an axial length;
a vane assembly for guiding flow from the chamber into the turbine wheel, the vane assembly comprising vanes that include at least dividing vanes, the

dividing vanes corresponding in number to the number of dividing walls, each dividing vane forming an extension of one of the dividing walls and extending generally radially inwardly from the dividing wall and terminating at a trailing edge of the dividing vane, the dividing vanes thereby extending the sector-division
5 of the turbine housing to the trailing edges of the dividing vanes; and

a variable-geometry mechanism comprising a tubular piston disposed radially inward of the chamber, the piston being axially slidable relative to the chamber between a relatively open position and a relatively closed position in which a fractional portion of the axial length of the sectors is blocked by the piston
10 so as to limit flow into the turbine wheel, wherein the piston and the dividing vanes overlap radially, the dividing vanes are mounted on one of the piston and a fixed structure of the turbine, and the dividing vanes are received in axially extending slots of the other of the piston and the fixed structure when the piston is in the closed position.

15 9. The turbine of claim 8, wherein the dividing vanes are mounted on the fixed structure of the turbine and the slots are formed in the piston for receiving the dividing vanes.

20 10. The turbine of claim 9, wherein the vane assembly further comprises additional vanes located circumferentially between the dividing vanes and mounted on the fixed structure.

11. The turbine of claim 10, wherein the additional vanes extend along less than the full axial length of the sectors and are axially located such that when the piston is in the closed position the additional vanes extend fully across that portion of the sectors that remains open.

25 12. The turbine of claim 8, wherein the dividing vanes are mounted on the piston and the slots are formed in the fixed structure for receiving the dividing vanes.

13. The turbine of claim 12, wherein the vane assembly comprises additional vanes located circumferentially between the dividing vanes.

14. The turbine of claim 12, wherein the fixed structure comprises a heat shroud.